

(Model.)

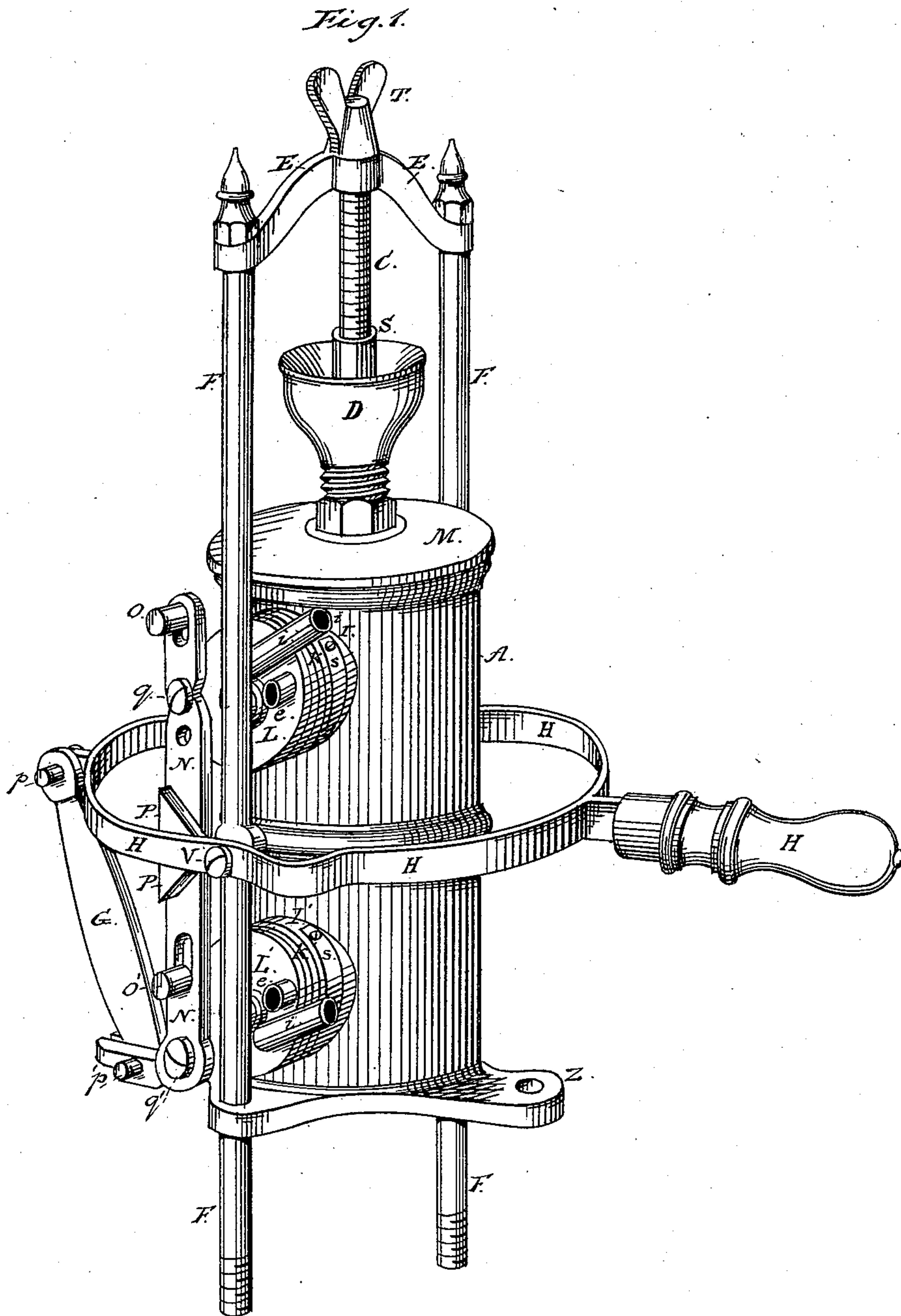
2 Sheets—Sheet 1,

N. B. BLACKMER.

AIR PUMP.

No. 256,276.

Patented Apr. 11, 1882.



Attest;

W. H. Howard

W. H. Singleton.

Inventor;

N. B. Blackmer  
per Stansbury & Munn  
his attys -

(Model.)

2 Sheets—Sheet 2.

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Fig. 2.

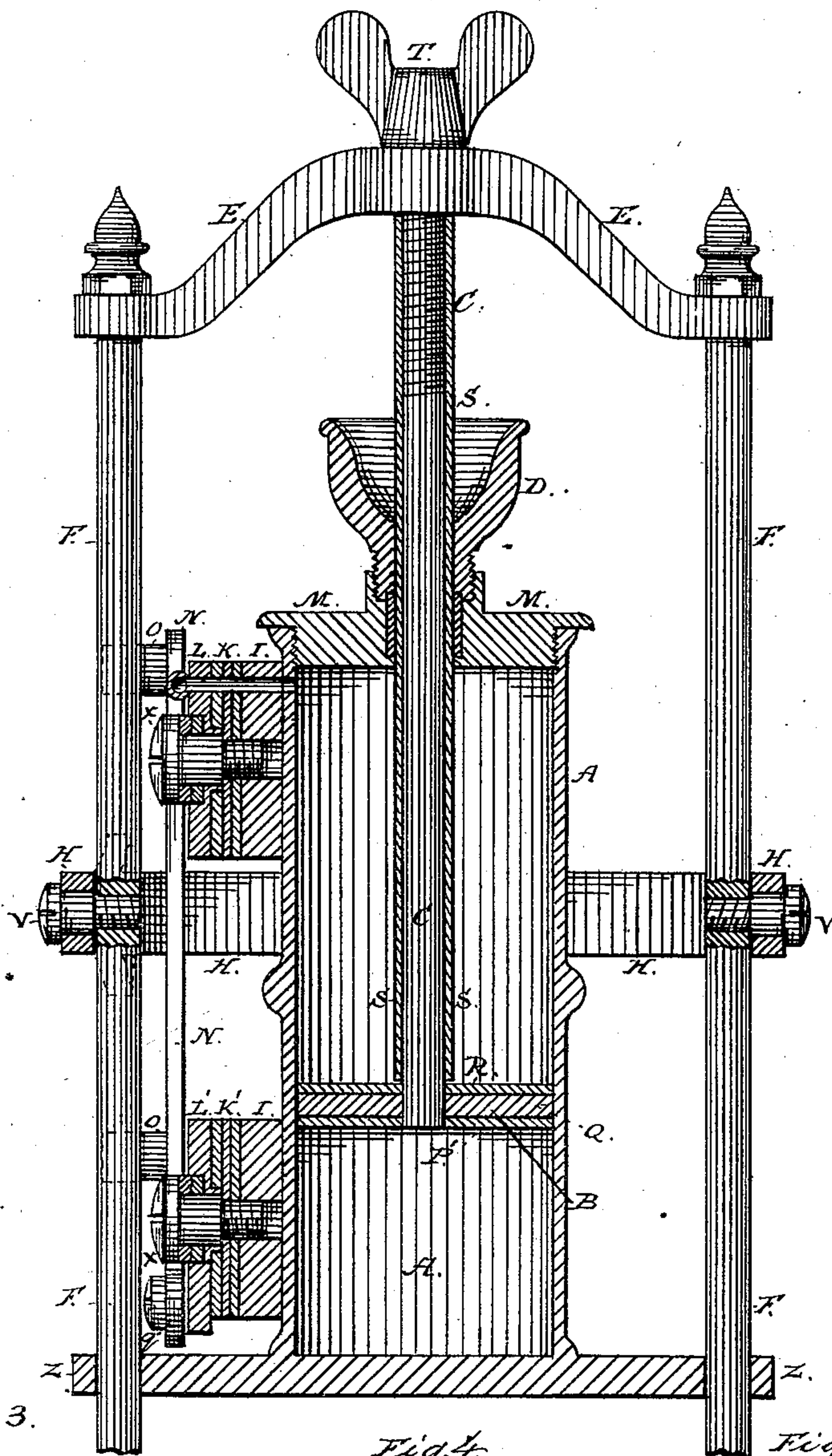


Fig. 3.

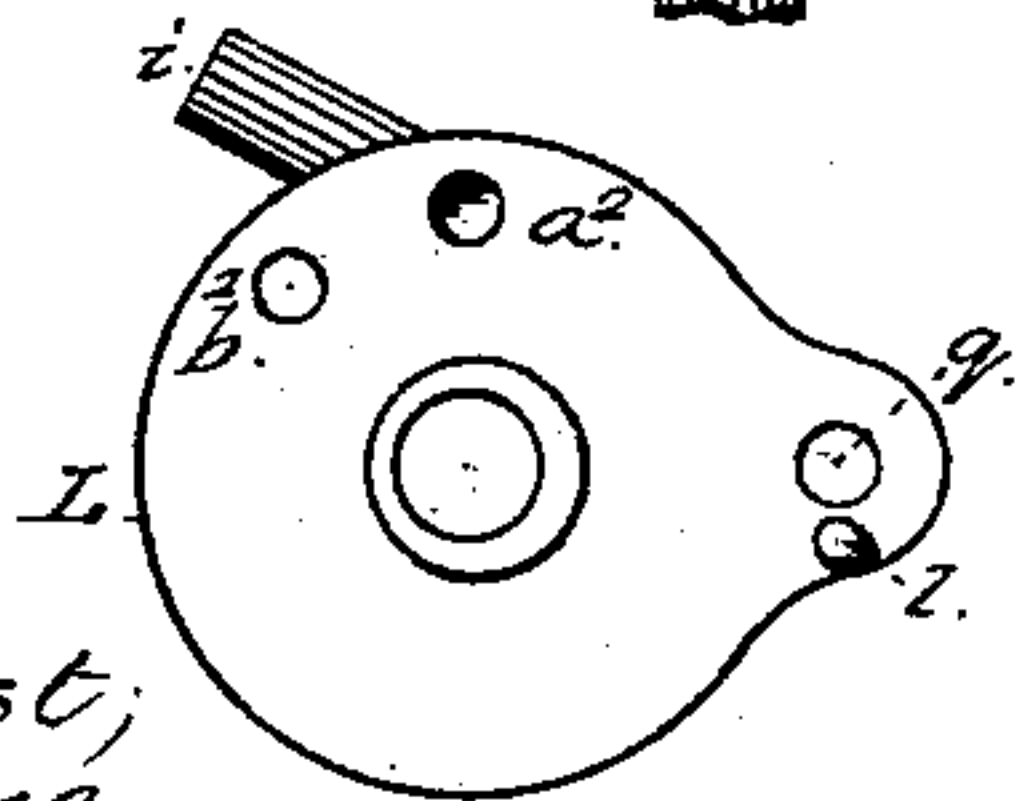


Fig. 4.

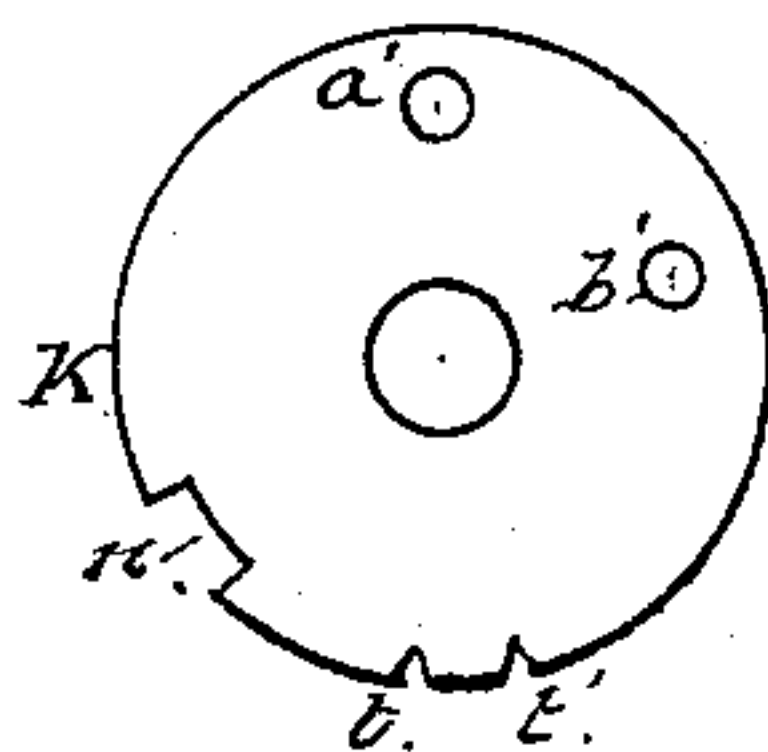
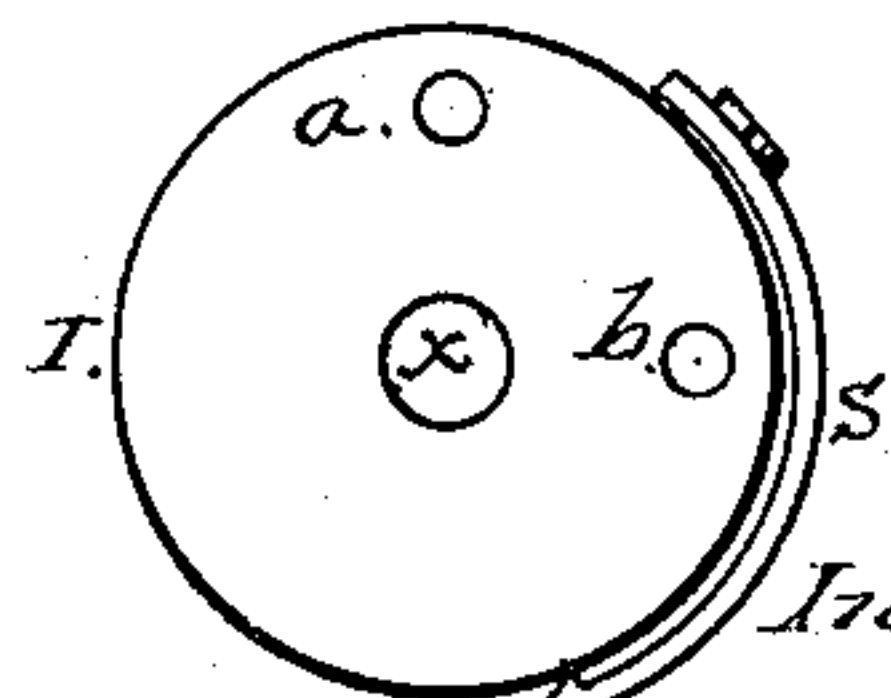


Fig. 5.



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# UNITED STATES PATENT OFFICE.

NAPOLEON B. BLACKMER, OF PORTAGE, WISCONSIN.

## AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 256,276, dated April 11, 1882.

Application filed July 15, 1881. (Model.)

*To all whom it may concern:*

Be it known that I, NAPOLEON B. BLACKMER, a citizen of the United States, residing at Portage, in the county of Columbia and State of Wisconsin, have invented a new and useful Improvement in Air-Pumps, of which the following is a specification.

My invention relates to a class of air-pumps used to exhaust air from a receiver or other vessel; and the object of my improvements is to so construct it that with one cylinder and one piston the air may be exhausted from either end of the cylinder. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of my improved air-pump. Fig. 2 is a vertical central section of the same, the guide-rods and cross-bar being in view. Figs. 3, 4, and 5 are detail views of the disks which operate to control the inlet and exhaust ports of the cylinder.

The same letter indicates the same part wherever it occurs in the drawings.

My invention relates to the class of double-acting air-pumps used to exhaust air from a receiver or other vessel, and so constructed that with one cylinder and one piston air can be alternately exhausted from the receiver by both ends of the cylinder.

My invention consists in the peculiar construction and operation of two series of disks applied to the ends of the cylinder to control the admission and expulsion of air, and of the mechanism by which said disks are operated automatically while the pump is in action, all as hereinafter more specifically set forth.

In the drawings, A marks the cylinder of the pump, attached to base-plate Z, and provided with the head M at top.

B is the piston, composed of the lower plate, P', fixed to the end of the piston-rod, the upper loose plate, R, and the elastic packing-ring Q, interposed between them. The piston is attached to the lower end of rod C, the upper end of which is threaded and passes through cross-bar E, attached to the top of guide-rods F F. A thumb-nut, T, is applied on the upper end of rod C, to draw it up or let it down, as required. A sleeve, S, held by a head, M, surrounds the rod C and extends down to the

loose plate R. It results from this construction that when by thumb-nut T the piston-rod C is drawn up the plate P' compresses the packing-ring Q against plate R and expands it, so that it bears tightly against the walls of the cylinder.

H marks the lever by which the pump is operated. It consists of a handle and a ring which surrounds the cylinder, and is pivoted at V V to the guide-rods F F. This lever is connected with the base of the cylinder by a link, G, pivoted at p to an eye on the ring H, and at p' to lugs on the base of the cylinder.

On the side of the upper and lower ends of the cylinder is a circular plate, I, (see Fig. 5,) provided with two holes, a b, about ninety degrees apart, both leading into the interior of the cylinder. This plate is stationary, and may be a part of the body of the cylinder. On its side is placed a spring, s, with a hook at the end, as shown.

On plate I is placed a disk, K, Fig. 4, of the same diameter, and provided with corresponding holes a' b', but nearer together by the diameter of one hole. This disk has a square notch, n, and two small notches, t t', to receive the hooked end of spring s.

On disk K is placed a disk, L, of which Fig. 3 is an inside view, the outer side being seen in Fig. 1. This disk has holes a<sup>2</sup> b<sup>2</sup>, nearer together by the diameter of one hole than the holes of disk K. It has also a lug, l, which projects into and engages with the notch n in disk K, but is smaller than the width of the notch by the diameter of one hole. It is also provided with the inlet and exhaust i e, as shown in Fig. 1. Both the disks L and K turn on a stud, x, passing through their centers and entering the center of plate I. The disks on both ends of the cylinder have the same construction, arrangement, and operation, serving alternately to control the inlet and exhaust openings of the two ends of the cylinder, one exhausting while the other takes air. The outer disks, L L, are connected by a rod, N, pivoted to them at q q'. This rod is provided with adjustable lugs o o', which alternately, as the lever H is vibrated, engage with the slanting sides of a triangular cam, P, attached to the inner side of the ring of lever H.



The vessel from which the air is to be pumped is to be connected to the inlet-pipes *i i* by rubber tubes.

It operates as follows: The motion of the lever is by the guide-rods and cross-head communicated to the piston. The piston moving up, the air rushes in behind it through the rubber hose from any vessel to which it may be attached until near the end of the stroke, when the lug *p* engages with the lug *o* at the upper end of the connecting-rod and changes the disks. The air is exhausted from behind the piston and expelled in front of it. It is necessary that in changing the disks the aperture through which the air is being expelled should remain open until the close of the stroke, while behind the piston the exhaust should close before the air rushes in behind the piston when the disks change, that the exhaust should close first and open first. This is accomplished by the disk *K* having the notch to engage with the lug on *L*. The three holes *a a' a<sup>2</sup>* being in line, and *L*, Fig. 3, receiving the motion from the connecting-rod, moves first, carrying *a<sup>2</sup> L* nearly off from *a' K* and *b<sup>2</sup> L* in line with *b' K*. The lug then engages in notch in *K* and carries *K* until *a' K* passes off from

*a I* and brings *b I* in line with *b' K*. The reverse stroke of the lever is then made, reversing the connecting-rod, and *b<sup>2</sup> L* is first carried away from *b' K* and *a<sup>2</sup> L* and *a' K* brought in line, when the lug engages with the other side of the notch and brings *a' K* and *a I* in line and *b' K* and *b I* out, ready for the reverse stroke of the piston.

I claim as my invention and desire to secure by Letters Patent—

1. The combination, with the piston and its rod, of the cross-head, guide-rods, lever, and link, substantially as and for the purposes herein specified.

2. The combination, with the flexible packing-ring, of the piston, rod, plate, sleeve, screw, cross-head, and nut, as set forth, substantially as and for the purposes specified.

3. In an air-pump, two sets of cut-off disks, each set being provided with holes adapted to register, as described, in combination with an operating-lever and a connecting-rod, whereby the sets are alternately worked, as set forth.

N. B. BLACKMER.

Witnesses:

J. S. BUEL,

L. A. RANDALL.